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1. An authentication communication system which includes
(a) a storage medium having an area for storing digital
information and (b) an access device for reading/writing
digital information from/into the area, the authentication
communication system comprising:

a first authentication phase in which the access
device authenticates whether the storage medium is
authorized according to a challenge-response
authentication protocol by transmitting scrambled access
information generated by scrambling access information
which shows the area, to the storage medium;

a second authentication phase in which the storage
medium authenticates whether the access device is
authorized; and

a transfer phase in which, when the storage medium
and the access device have authenticated each other as
authorized devices, the storage medium extracts the access
information from the scrambled access information, and
the access device reads/writes digital information
from/into the area shown by the access information.

2. The authentication communication system of Claim 1,

wherein in the first authentication phase,
the access device includes:

an access information acquisition unit for acquiring

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the access information which shows the area;

a random number acquisition unit for acquiring a random number;

5 a generation unit for generating random number access information by combining the access information and the random number; and

10 an encryption unit for encrypting the random number access information according to an encryption algorithm, to generate the scrambled access information,

15 the storage medium includes a response value generation unit for generating a response value from the scrambled access information, and

20 the access device includes an authentication unit for authenticating whether the storage medium is authorized using the response value.

3. The authentication communication system of Claim 2, wherein in the transfer phase, the storage medium includes:

25 a decryption unit for decrypting the scrambled access information according to a decryption algorithm to obtain the random number access information; and

a separation unit for separating the access information from the random number access information.

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4. The authentication communication system of Claim 3, wherein in the first authentication phase,

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the access device further includes a random number seed storage unit for storing a random number seed, and
the random number acquisition unit acquires the random number by reading the random number seed from the
5 random number seed storage unit.

5. The authentication communication system of Claim 4,
wherein in the first authentication phase, the
access device further writes the scrambled access
10 information over the random number seed stored in the random number seed storage unit, as a new random number seed.

6. The authentication communication system of Claim 3,
wherein in the first authentication phase,
15 the access device further includes a random number seed storage unit for storing a random number seed, and
the random number acquisition unit acquires the random number, by reading the random number seed from the random number seed storage unit and generating the random
20 number based on the random number seed.

7. The authentication communication system of Claim 6,
wherein in the first authentication phase, the
access device further writes the random number over the
25 random number seed stored in the random number seed storage unit as a new random number seed.

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8. The authentication communication system of Claim 3,
wherein in the transfer phase,
the storage medium, which stores digital
information in the area, includes an encryption unit for
5 reading the digital information from the area shown by
the access information and encrypting the digital
information according to an encryption algorithm to
generate encrypted digital information, and
the access device, which reads the digital
10 information from the area, includes a decryption unit for
decrypting the encrypted digital information according
to a decryption algorithm to obtain the digital information,
the decryption algorithm being an algorithm for decrypting
a cryptogram generated according to the encryption
15 algorithm.

9. The authentication communication system of Claim 3,
wherein in the transfer phase,
the access device, which writes digital information
20 into the area, includes:
a digital information acquisition unit for
acquiring the digital information; and
an encryption unit for encrypting the digital
information according to an encryption algorithm to
25 generate encrypted digital information, and
the storage medium includes a decryption unit for
decrypting the encrypted digital information according

to a decryption algorithm to obtain the digital information, and writing the digital information into the area shown by the access information, the decryption algorithm being an algorithm for decrypting a cryptogram generated 5 according to the encryption algorithm.

10. The authentication communication system of Claim 3, wherein in the transfer phase,

10 the access device, which writes digital information into the area, includes:

a digital information acquisition unit for acquiring the digital information;

a content key acquisition unit for acquiring a content key;

15 a first encryption unit for encrypting the acquired content key according to a first encryption algorithm to generate an encrypted content key;

20 a second encryption unit for encrypting the encrypted content key according to a second encryption algorithm to generate a double-encrypted content key; and

a third encryption unit for encrypting the digital information according to a second encryption algorithm using the content key, to generate encrypted digital information,

25 the storage medium includes a decryption unit for decrypting the double-encrypted content key according to a first decryption algorithm to obtain the encrypted

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content key, and writing the encrypted content key into the area shown by the access information, and

the storage medium further includes an area for storing the encrypted digital information.

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11. An authentication communication method which includes (a) a storage medium having an area for storing digital information and (b) an access device for reading/writing digital information from/into the area, the authentication communication method comprising:

a first authentication step in which the access device authenticates whether the storage medium is authorized according to a challenge-response authentication protocol by transmitting scrambled access information generated by scrambling access information which shows the area, to the storage medium;

a second authentication step in which the storage medium authenticates whether the access device is authorized; and

20 a transfer step in which, when the storage medium and the access device have authenticated each other as authorized devices, the storage medium extracts the access information from the scrambled access information, and the access device reads/writes digital information 25 from/into the area shown by the access information.

12. A computer-readable storage medium which stores an

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authentication communication program for use in an authentication communication system (a) which includes a storage medium having an area for storing digital information and an access device for reading/writing digital information from/into the area, and (b) in which the digital information is transferred after each of the storage medium and the access device authenticates each other as authorized devices, the authentication communication program comprising:

10 a first authentication step in which the access device authenticates whether the storage medium is authorized according to a challenge-response authentication protocol by transmitting scrambled access information generated by scrambling access information
15 which shows the area, to the storage medium;

a second authentication step in which the storage medium authenticates whether the access device is authorized; and

20 a transfer step in which, when the storage medium and the access device have authenticated each other as authorized devices, the storage medium extracts the access information from the scrambled access information, and the access device reads/writes digital information from/into the area shown by the access information.

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13. An access device which is included in the authentication communication system of Claim 1.

14. An access device which is included in the authentication communication system of Claim 2.

5 15. A storage medium which is included in the authentication communication system of Claim 1.

16. A storage medium which is included in the authentication communication system of Claim 3.

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